

Ground Lesson 2 – Basic Aerodynamics - Stability, Control, Forces, Stall.

Objective:

For the student to have an understanding of basic aerodynamics and the forces acting on an aircraft.

Content:

The forces acting on an airplane

Weight - ____empty ____max ____usable load

Lift

____ Streamline/turbulent flow ____ Bernoulli's Principle ____ Dynamic/static pressure
____ Airspeed ____ Airfoil shape ____ Aerodynamic force ____ Newton's Third Law

Drag

____ Total drag ____ Parasite drag ____ Skin-friction drag ____ Form drag
____ Interference drag ____ Induced drag ____ Angle-of-attack ____ Wing design
____ Lift/drag ratio
____ Line and riser drag

Thrust

____ Propeller motion ____ Forces on a propeller blade
____ Propeller efficiency ____ Takeoff effects of propellers
____ Propeller torque effect ____ Gyroscopic effect ____ P-factor

Stability and control

____ Airplane equilibrium ____ Stability ____ Static/dynamic stability ____ Stability vs. maneuverability
____ Pitching moments ____ Longitudinal/directional/lateral stability

Control

____ Control effectiveness and pendulum effect

Forces

____ Straight-and-level ____ Climbing and descending
____ Turning and load factor ____ Forces in a turn ____ Thrust in a turn

Completion Standards:

This lesson is complete when the student successfully understands the forces acting on an aircraft as listed above.

Assignment for this ground lesson:

- Read FAA *Pilot's Handbook of Aeronautical Knowledge*, Chapters 2 and 3, as specified in "HPTS Sport Pilot Guide of What to Study," in this book.
- Read and study the questions in the Sport Pilot Prepware CD "Aircraft" section.
- Read FAA *Powered Parachute Flying Handbook Chapter 1 pages 1-1 through 1-4 up until Aeronautical Decision Making. Read FAA Powered Parachute Flying Handbook Chapter 5.*

Lesson Results:

Date of completion _____ Instructor Signature/ID _____

Student Signature _____ Ground Time _____

Instructor remarks: